

CLAIMS

1. A molecular bonding method wherein external energy is supplied to an intermediate excitation medium fixed on a support to excite said intermediate excitation medium, thereby bonding a first molecule having a bonding residue, which is in the vicinity of said intermediate excitation medium which has been excited, with a bonding target to be bonded to said first molecule.

2. The molecular bonding method according to Claim 1, wherein said bonding is accomplished with either one or both of said first molecule and said bonding target fixed to a fixing member.

3. The molecular bonding method according to Claim 2, wherein said bonding is accomplished with said support positioned accurately enough with respect to said fixing member so as to achieve said bonding.

4. The molecular bonding method according to Claim 3, wherein said bonding is accomplished with said accuracy of 1 nm or less.

20 5: The molecular bonding method according to any one of Claims 1 through 4, wherein said bonding is accomplished by means of bonding energy which moves from said intermediate excitation medium which has been excited to said first molecule.

25 6. The molecular bonding method according to Claim 5, wherein movement of bonding energy from said intermediate excitation medium to said first molecule is accomplished by

excited triplet energy transfer.

7. The molecular bonding method according to any one of Claims 1 through 4, wherein said bonding is accomplished due to transfer of electrons between said intermediate 5 excitation medium which has been excited and said first molecule.

8. The molecular bonding method according to any one of Claims 1 through 7, wherein said external energy is supplied by supplying light, electrons or ions to said 10 intermediate excitation medium.

9. The molecular bonding method according to Claim 8, wherein, when said intermediate excitation medium is a photosensitized molecule, said external energy is supplied by exposure to said light.

15 10. The molecular bonding method according to Claim 9, wherein a N-acetyl-4-nitro-1-naphthylamine derivative is used as said photosensitized molecule.

11. The molecular bonding method according to Claim 7, wherein, when said intermediate excitation medium is a 20 photocatalyst, said external energy is supplied by exposure to said light.

12. The molecular bonding method according to Claim 11, wherein titanium dioxide is used as said photocatalyst.

13. The molecular bonding method according to any one 25 of Claims 1 through 12, wherein a second molecule having a bonding residue is used as said bonding target.

14. The molecular bonding method according to any one

of Claims 1 through 12, wherein a material other than a molecule is used as said bonding target.

15. A molecular bonding device comprising:

a support;

5 an intermediate excitation medium fixed on said support; and

an external energy supply which supplies said intermediate excitation medium with external energy to excite said intermediate excitation medium, thereby bonding

10 a first molecule which has a bonding residue and which is in the vicinity of said excited intermediate excitation medium with a bonding target which is to be bonded to said first molecule.

16. The molecular bonding device according to Claim 15,  
15 wherein either one or both of said first molecule and said bonding target is fixed to a fixing member.

17. The molecular bonding device according to Claim 16,  
wherein said support is positioned accurately enough with respect to said fixing member so as to achieve said bonding.

20 18. The molecular bonding device according to Claim 17,  
wherein said accuracy is 1 nm or less.

19. The molecular bonding device according to any one of Claims 15 through 18, wherein said intermediate excitation medium which has been excited generates bonding  
25 energy which moves from said intermediate excitation medium which has been excited to said first molecule to achieve said bonding.

20. The molecular bonding device according to any one of Claims 15 through 18, wherein said intermediate excitation medium which has been excited accomplishes said bonding by transfer of electrons between said intermediate 5 excitation medium which has been excited and said first molecule.

21. The molecular bonding device according to any one of Claims 15 through 20, wherein said external energy is light, electrons or ions.

10 22. The molecular bonding device according to Claim 21, wherein when said intermediate excitation medium is a photosensitized molecule, said external energy is said light.

15 23. The molecular bonding device according to Claim 22, wherein said photosensitized molecule is a N-acetyl-4-nitro-1-naphthylamine derivative.

24. The molecular bonding device according to Claim 21, wherein, when said intermediate excitation medium is a photocatalyst, said external energy is said light.

25. The molecular bonding device according to Claim 24, 20 wherein said photocatalyst is titanium dioxide.

26. The molecular bonding device according to any one of Claims 15 through 25, wherein said bonding target is a second molecule having a bonding residue.

25 27. The molecular bonding device according to any one of Claims 15 through 25, wherein said bonding target is a material other than a molecule.

28. The molecular bonding device according to any one

of Claims 15 through 27, wherein said intermediate excitation medium is fixed to said support by chemical bonds.

29. The molecular bonding device according to any one of Claims 15 through 28, wherein said bonding residue is an 5 aliphatic residue having an unsaturated double bond or unsaturated triple bond.

30. The molecular bonding device according to any one of Claims 15 through 28, wherein said bonding residue is an aromatic residue having an unsaturated double bond or 10 unsaturated triple bond.

31. The molecular bonding device according to Claim 30, wherein, when said aromatic residue having said unsaturated double bond is a cinnamic acid residue, said intermediate excitation medium is N-[3-{3,5-bis{3,5-bis[3,5-bis(4- 15 mercaptobenzylthio)benzylthio]benzylthio}benzyloxy}- propionyl-4-nitro-1-naphthylamine.